

WHAT IS CLAIMED IS:

1. A semiconductor wafer cleaning system, comprising:
  - a cleaning chamber;
  - a wafer support disposed within said chamber and configured to support a plurality of wafers within said chamber as spaced from one another in a first direction;
  - a source of cleaning solution associated with said cleaning chamber such that said cleaning chamber can be filled with cleaning solution from said source;
  - a source of de-ionized water;
  - de-ionized water supply nozzles connected to said source of de-ionized water and oriented to spray deionized water from said source thereof into said chamber towards wafers supported by said wafer support,
  - each of the de-ionized water supply nozzles having a main body in the form of a pipe defining an inner nozzle passageway, and a plurality of sets of nozzle holes connected to the inner nozzle passageway, the main bodies of said de-ionized water supply nozzles extending longitudinally in said first direction at opposites sides of said wafer support, the nozzle holes of each said set lying in a plane perpendicular to said first direction, and said sets of nozzle holes being spaced from each other along the length of the main body, and
  - each said set of said nozzle holes subtending an angle of 80~100° about the inner nozzle passageway from which the set of nozzle holes extends so that the de-ionized water is sprayed through each said set of nozzle holes over a range of

80~100° as measured in the circumferential direction of the main body of the nozzle; a discharge section including at least one discharge pipe connected to a lower part of said cleaning chamber, and an overflow tank surrounding an upper part of said cleaning chamber; and control means for controlling the rates at which de-ionized water is fed through said de-ionized water supply nozzles and at which fluid in said chamber is discharged via said discharge section.

2. The system of claim 1, wherein each of sets of nozzle holes consists of five nozzle holes.

3. The system of claim 1, wherein the inner nozzle passageway of each said de-ionized water supply nozzle has a diameter thereof of  $0.8\pm0.05\text{mm}$ , and the nozzle holes each have a diameter of  $0.5\sim\pm0.05\text{mm}$ .

4. The system of claim 1, wherein discharge section includes at least two discharge pipes connected to a lower part of said cleaning chamber at locations spaced from one another in said first direction.

5. A method of cleaning semiconductor wafers, comprising:  
filling a cleaning chamber with a cleaning solution;  
washing a plurality of wafers by submerging the wafers in the cleaning solution within the cleaning chamber with the wafers being oriented vertically and

spaced from each other in a first direction;

subsequently rinsing the vertically oriented wafers within the cleaning chamber by supplying de-ionized water to de-ionized water spray nozzles having nozzle holes directed towards respective vertically oriented surfaces of the wafer, and thereby spraying the de-ionized water into the cleaning chamber and onto the surfaces of the wafers within the chamber;

continuing the spraying of the de-ionized water into the cleaning chamber such that liquid in the cleaning chamber begins to overflow the cleaning chamber;

draining the liquid in the cleaning chamber from a lower part of the cleaning chamber as the de-ionized water is sprayed into the cleaning chamber, and the liquid overflows the cleaning chamber; and

controlling the supplying of the de-ionized water to the de-ionized water spray nozzles and said draining of said liquid such that liquid in an amount of 92-97 weight% of the de-ionized water that is being supplied by the nozzles into the cleaning chamber is simultaneously discharged from the cleaning chamber through the lower part of the cleaning chamber 30, while liquid in an amount of 3-8 weight% of the de-ionized water that is being supplied by the nozzles is simultaneously discharged as overflowing the cleaning chamber, all while the wafers remain within the cleaning chamber.

6. The method of claim 5, wherein said controlling the supplying of the de-ionized water to the de-ionized water spray nozzles comprises regulating the flow of de-ionized water through said nozzles to a rate of 21~26 l/min.

7. The method as claimed in claim 5, wherein said spraying of the de-ionized water into the cleaning chamber comprises spraying the water onto the surfaces of the over a range of 80~100° in a vertical plane in which each of said surfaces lies.
  
8. The method as claimed in claim 6, wherein said spraying of the de-ionized water into the cleaning chamber comprises spraying the water onto the surfaces of the over a range of 80~100° in a vertical plane in which each of said surfaces lies.
  
9. The method as claimed in claim 5, wherein said discharging of the de-ionized water from the lower part of the leaning chamber is carried out at at least two locations aligned in said first direction in which the wafers W are spaced from each other.